COGNITIVELY ENGAGING PHYSICAL ACTIVITY AND COGNITIVE PERFORMANCE: IS THERE A DOSE-RESPONSE RELATIONSHIP?

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In the present study, the assumption that there is a dose-response relationship between the cognitive challenge of an acute physical activity bout and the subsequently measured cognitive performance was tested. Moreover, potential differential effects in one's "need for cognition" were investigated. Overall, 48 students (age = 25.35 ± 3.22 years, 50% female) participated in this balanced within-subjects design study. After measuring the maximum oxygen uptake capacity, the need for cognition, and other background variables, the subjects went through four experimental conditions: one sitting (low cognitive engagement), and three on a cycle-ergometer with an individualized intensity level (65% HRR) varying in the amount of cognitive engagement (low, medium, or high). During the 20-minute intervention, cognitive and physical exertion, stress, and affect were measured with questionnaires. After a five-minute cool-down, a computer-based Stroop task was performed to measure executive functioning. ANOVAs revealed a successful manipulation of the cognitive challenge, with conditions differing both in induced stress and affective state. After controlling for the individual's need for cognition, a dose-response relation between the cognitive challenge and cognitive performance was detected. People with a high need for cognition benefit more from cognitively demanding physical activities than people with a low need for cognition.